Programming Languages

Course Code:

CSE 351

Course Period:

Autumn

Course Type:

Core

Credits:

3

Theoric:

2

Practice:

0

Laboratory Hour:

2

ECTS:

6

Prerequisite Courses:

Fundamentals of Computer Programming [1]
Course Language:

English

Course Objectives:

The aim of this course is to provide students with knowledge and abilities to design programming languages using modern methodologies and to implement their design using modern development tools.

Course Content:

Principles of design and implementation of contemporary programming languages, language syntax (lexical properties, BNF and parsing), language processors (compilers and interpreters), representations (data structures, control structures and binding), and styles (procedural, functional programming, logic programming, modular programming, object oriented programming), term project.

Course Methodology:

1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study

Course Evaluation Methods:

A: Testing, B: Experiment, C: Homework, D: Project

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) Adequate knowledge in programming language concepts; ability to use theoretical and applied information in these areas to model and solve engineering problems.	1,6	1,2	A, C, D
2) Ability to design and implement the compiler frontend (lexical, syntactic and semantic analysis stages) under realistic constraints and conditions.	3,4,6	1,2,3	B, C, D
3) Ability to explain, use and compare, and contrast the program structures (names, binding, type checking, scoping) in various programming languages.	1,6	1,2,3	A, C
4) Ability to devise, select, and use modern techniques and tools needed for the design and implementation of programming languages.	4,6	1,2,3	B, D

COURSE CONTENT

Week	Topics	Study Materials
1	INTRODUCTION, LANGUAGE DESIGN, MACHINE ARCHITECTURE	
2	LEXICAL ANALYSIS	
3	SYNTAX ANALYSIS I (GRAMMAR, DERIVATION)	
4	SYNTAX ANALYSIS II (PARSE TREES, AMBIGUITY)	

5	SEMANTIC ANALYSIS (STATIC SEMANTICS)
6	SEMANTIC ANALYSIS (DYNAMIC SEMANTICS)
7	MIDTERM EXAM I
8	NAMES, BINDING, TYPE CHECKING, SCOPING
9	DATA TYPES, EXPRESSIONS AND ASSIGNMENT STATEMENTS
10	STATEMENT-LEVEL CONTROL DATA TYPES
11	SUBPROGRAMS (ARI, SCOPE AND PARAMETER TRANSMISSION)
12	SUBPROGRAM IMPLEMENTATION
13	MIDTERM EXAM II
14	SUPPORT FOR OBJECT ORIENTED PROGRAMMING

RECOMMENDED SOURCES

Textbook	SEBESTA, R.W., “CONCEPTS OF PROGRAMMING LANGUAGES”, 10th Ed., PEARSON (TEXTBOOK) PRATT, T.W., ZELKOWITZ, M.V., “PROGRAMMING LANGUAGES, DESIGN AND IMPLEMENTATION”, PRENTICE HALL
Additional Resources	Lecture Notes: http://cse.yeditepe.edu.tr/v2/en/academic/course-pages [2] Lab material: http://cse.yeditepe.edu.tr/v2/en/academic/course-pages [2]

MATERIAL SHARING

Documents	
Assignments	Homework assignments are on 1) lexical analysis, 2) syntax analysis, 3) semantic analysis, 4) static and dynamic scoping, 5) subprogram implementation and 6) parameter passing subjects. Term project is on the design and implementation of a translator.
Exams	The first midterm examination covers language evaluation and compilation stages, and the second midterm examination covers naming, types, scoping and subprograms. Final examination covers all the topics.

ASSESSMENT

IN-TERM STUDIES	NUMBER	PERCENTAGE
Mid-terms	1	40
Quizzes	0	0
Assignment	5	15
Lab Work	8	15
Term Project	1	30
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
Total		**100**

COURSE'S CONTRIBUTION TO PROGRAM

No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering problems.					**X**
2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**				
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.					**X**
4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.					**X**
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.					
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.					**X**
7	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.					

8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	**X**
9	Awareness of professional and ethical responsibility.	**X**
10	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	
11	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 12x Total course hours)	12	4	48
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Midterm examination	1	2	2
Homework	5	4	20
Project	1	50	50
Final examination	1	3	3
Total Work Load			179
Total Work Load / 25 (h)			7.16
ECTS Credit of the Course			7